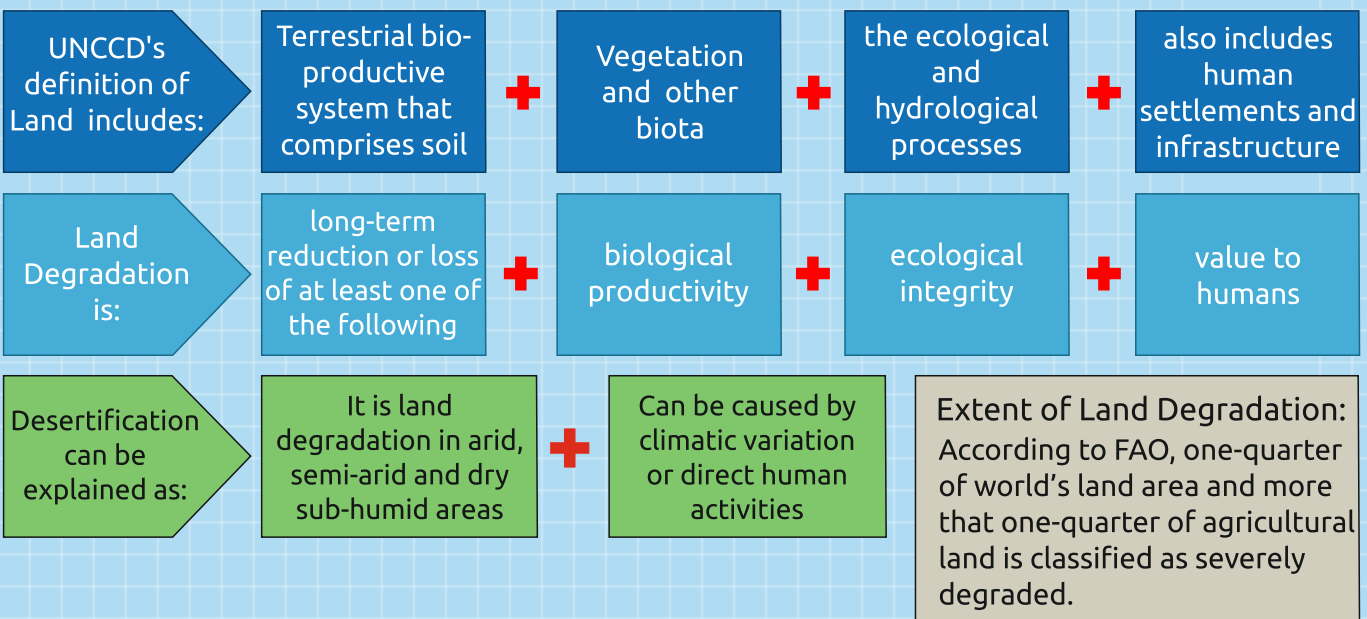
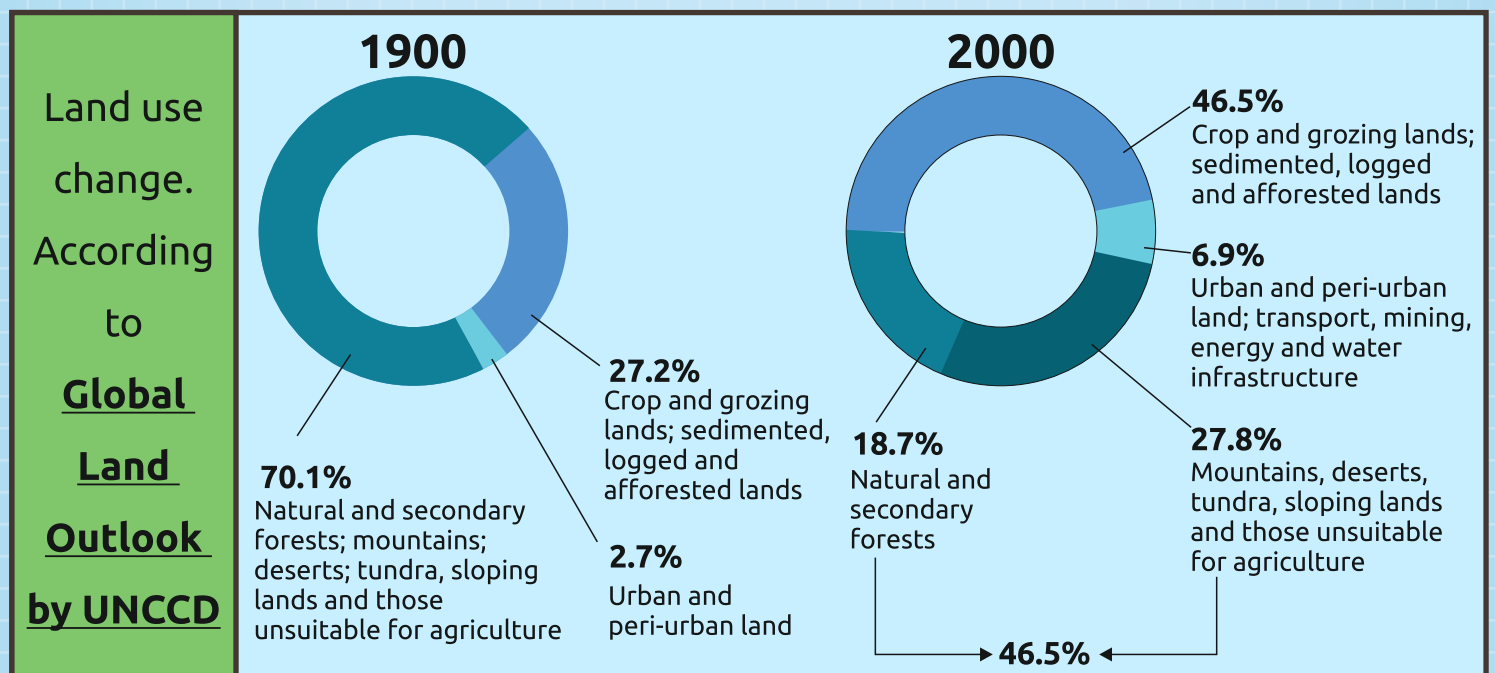
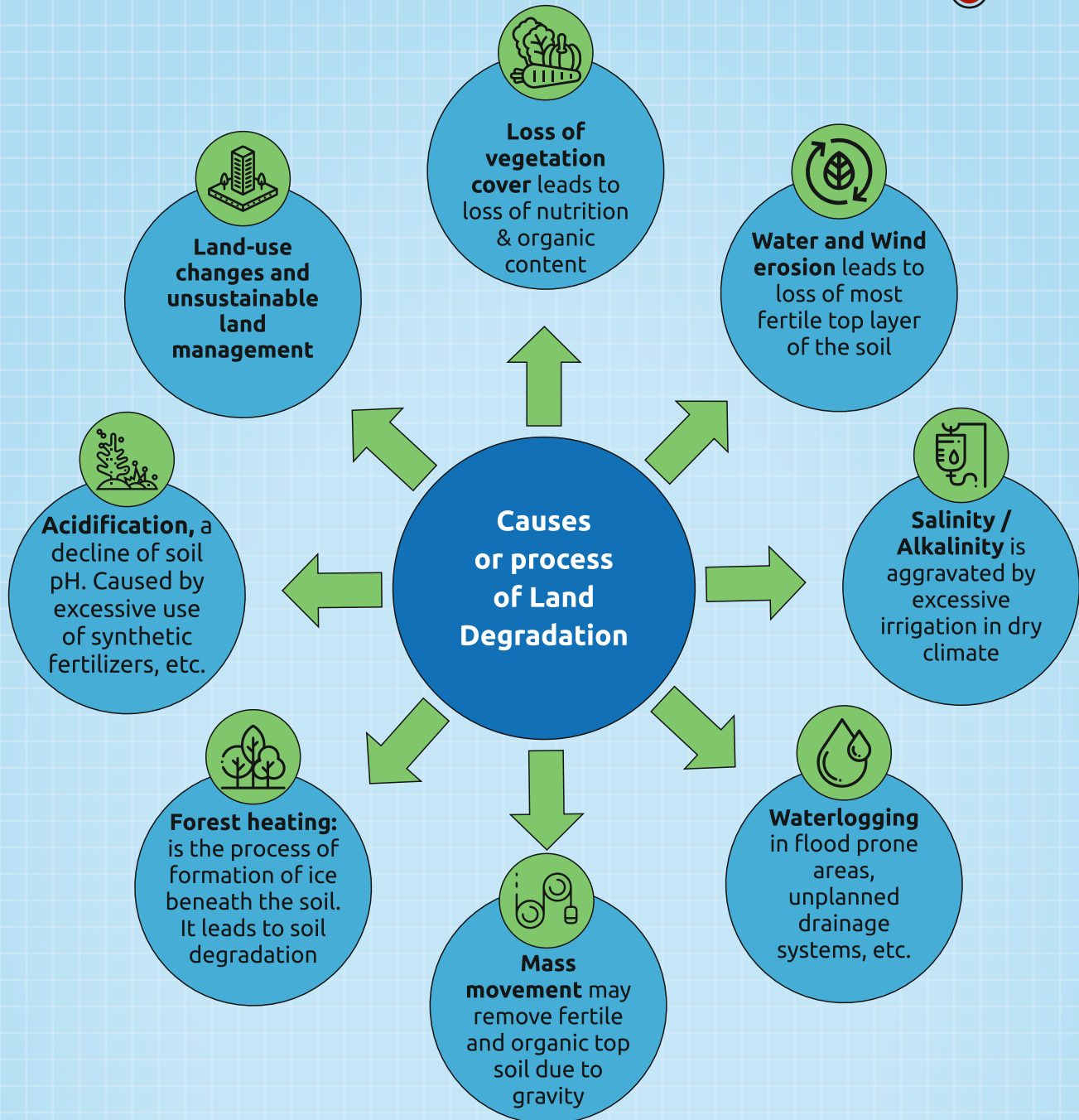




QUICK REVISION MODULE (UPSC PRELIMS 2022) ENVIRONMENT






LAND AND WATER DEGRADATION LAND DEGRADATION

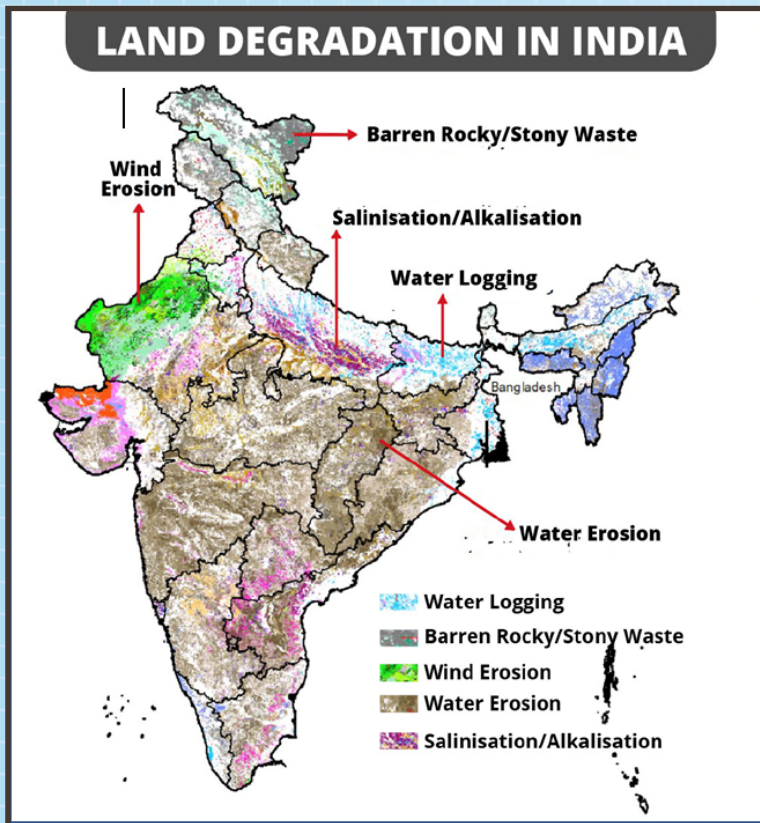






IMPACT OF LAND DEGRADATION

Impacts on	Response on/through		Results in
Ecosystem services 	Provisioning services	Ex.– conversion of forest into farmland	Though it increases food availability, it results in a reduction of both biodiversity and carbon sinks.
	Regulation services	Ex.– water regulation services impact	Flooding, drought
	Cultural services	EX.– recreation and tourism	Directly impacted
	Supporting services	Ex.–deforestation and expansion of extensive agriculture	Degradation of natural habitat
Climate 	Carbon sink		Land degradation results into scape of carbon from carbon sinks.
	Release of non-CO2 greenhouse gases		Through increased rice cultivation, ruminant stocks and manure disposal results in the higher release of CH4, N2O, and NH3 gases.
	Albedo change		Increased grazing, deforestation, and forest fires result in albedo change and thus impacting the global radiative balance, as a result, it leads to net climate cooling/warming.
Food security and poverty 	Agricultural productivity		Annual productivity decline undermines sustainable development, food, and water security, and results in human migration and even civil conflict. It affects the weak and the poor disproportionately.
	Gross Domestic Product (GDP)		It has a direct negative and strong impact which is difficult to directly account for. The economic cost in terms of loss of ecosystem goods and services is estimated to be US\$ 6.3 trillion a year equivalent to 8.3% of global GDP in 2016.
Gender and education 	It affects the women and children disproportionately and results in increased timing requirements of food production, fuelwood collection.		Children missing schools, a higher dropout rate, reduced child care time, reduced time for other work and for leisure activities. Women have to travel long distances to get water.
Human health 	Indirect impact		Through climate change, biodiversity loss, loss in agricultural productivity, etc.
	Direct impact		Can cause chronic bronchitis and respiratory illness.



INDIA

Accounts for 2.4% of world's total land area and 18% of its total population.

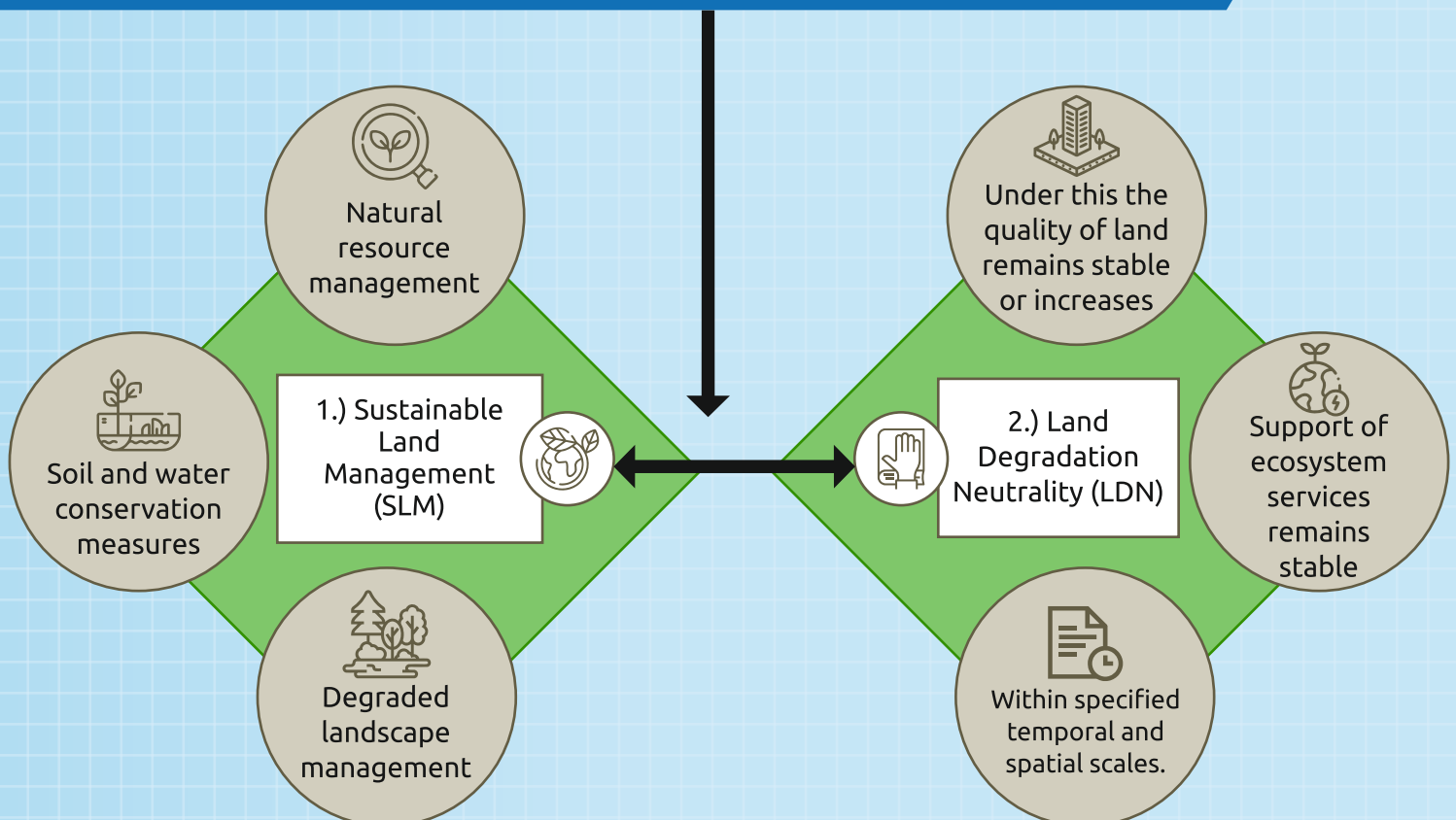
According to the State of India's Environment 2019, 30% of India's total geographical area is affected by land degradation

60% of the land is under cultivation, with agriculture contributing 14% of its GDP.

Land degradation is highly concentrated in some regions. 9 states accounting for 82% of degradation.

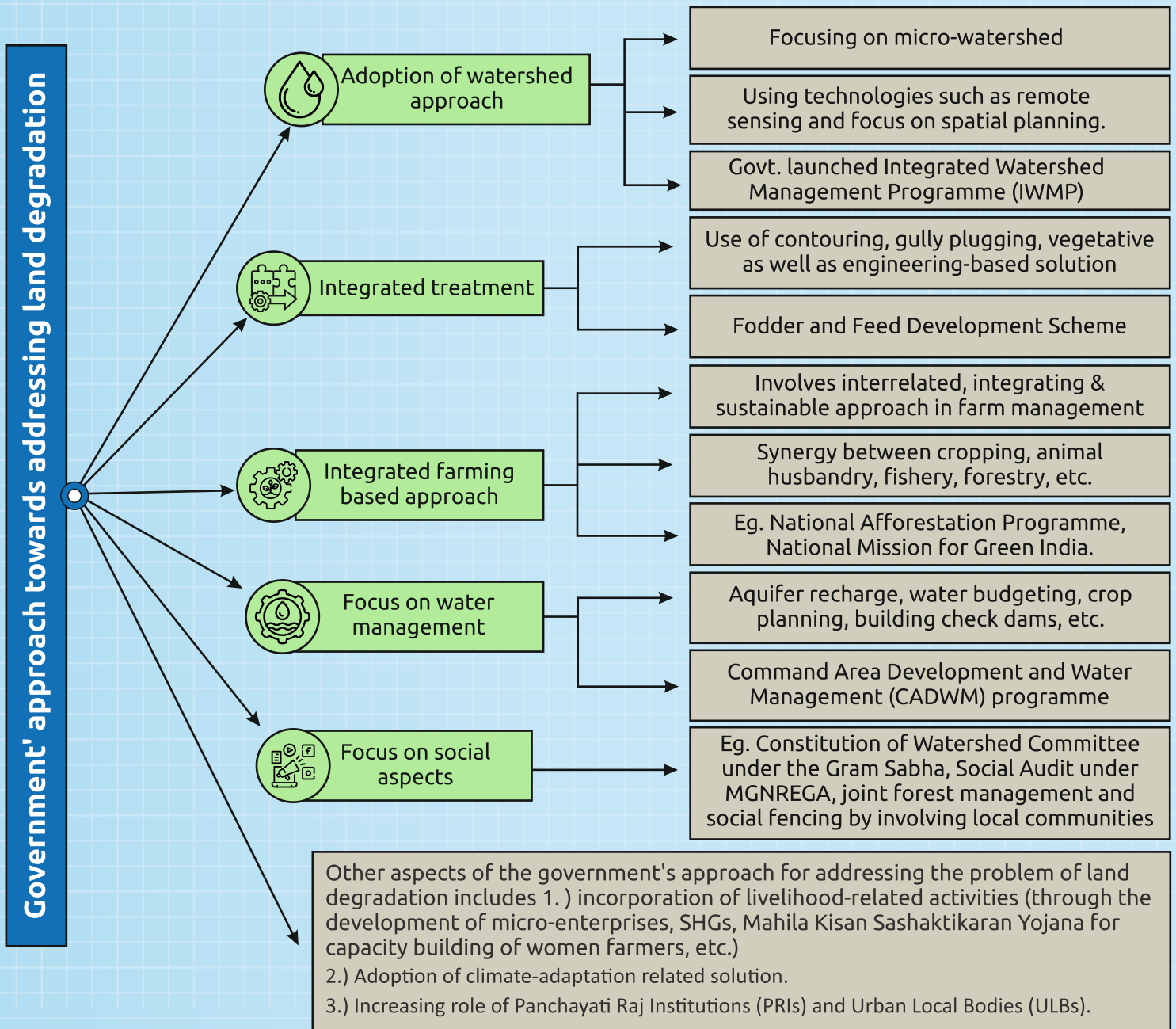
Sustainable Development Goal (SDG) 15 (Life on Land), is of direct relevance to land degradation. **Target 15.3** specifically addresses Land Degradation Neutrality (LDN).

METHODS OF LAND RECLAMATION AND CONSERVATION:





SLM includes:	Steps taken in India to achieve LDN:
<ul style="list-style-type: none"> ➤ Reforestation ➤ Agroforestry ➤ Terrace cultivation in hilly and mountainous areas ➤ Sand dunes fixation prevents movement of sand ➤ Windbreaks, linear planting of trees and shrubs, to prevent erosion by wind. ➤ Firebreaks act as barrier in progress of wildfires ➤ Zai technique Involves digging a pit in soil to catch water and concentrate compost. 	<ul style="list-style-type: none"> ➤ Comprehensive National Plan to Combat Desertification launched in 2001 for 20 years, talks about community-based approach. ➤ Desertification and Land Degradation Atlas (2016) by ISRO & others. ➤ Adopted Bonn Challenge to restore 13-million-hectare of degraded land by 2020 & 8 million more by 2030. ➤ Government of India in collaboration with global environment facility launched Sustainable Land and Ecosystem Management (SLEM) programme. ➤ National Green Mission ➤ Integrated Watershed Management Programme ➤ At UNCCD COP 14 (New Delhi) 2019, Delhi declaration was adopted. Pledge to restore 26 million hectares till 2030 & to set up a Centre of Excellence at Forest Research Institute, Dehradun.





Schemes addressing desertification:

Schemes	Ministry	Objectives
Drought Prone Areas programme (DRAP)	Ministry of Rural Development	To minimise the adverse effects of drought on the production of crops, livestock, and productivity of land, water, and human resources ultimately leading to drought proofing of the affected areas.
Desert Development Programme (DDP)	Ministry of Rural Development	To minimise the adverse effect of drought and control desertification through rejuvenation of natural resource base of the identified desert areas.
National Watershed Development Program for Rainfed Areas (NWDPA)	Ministry of Agriculture	To strengthen people's participation in project planning, implementation, and monitoring by generating awareness on the programme measures of the schemes so as to transform watershed management as people's movement with tapering departmental support.

GLOBAL POLICY RESPONSES TO LAND DEGRADATION:

During the **Stockholm UN Conference on the Human Environment in 1972** first effort on tackling land degradation was made.

In 1992 at the Rio Summit land degradation was recognised as a major challenge to sustainable development.

Reducing Emissions from Deforestation and Forest Degradation (REDD+) Aims to encourage developing countries to contribute to climate change mitigation efforts by reducing greenhouse gas emissions. It focuses on sustainable management of forests and enhancement of forest carbon stocks.

The **Johannesburg World Summit** on sustainable development WSSD in 2002 designated the global environment facility as the funding agency for the implementation of UNCCD.

The **Land for Life Programme** was launched at the UNCCD Conference of the Parties (CoP) 10 to confront the challenges of land degradation and desertification.

The **Born Challenge** is a global effort to bring 150 million hectares of the world's deforested and degraded land into restoration by 2020 and 350 million hectares by 2030.

The UN General Assembly declared the UN Decade on Ecosystem Restoration 2021-2030 (which is co-led by FAO and UNEP), which is expected to shine an additional spotlight on land restoration and mobilise financial resources.

United Nations Convention to Combat Desertification (UNCCD)

- It was established in 1994. UNCCD is the sole legally binding international agreement linking environment and development to sustainable land management. It is one of the conventions adopted during the World Earth Summit at Rio de Janeiro in 1992.
- The convention focuses on arid, semi-arid, and dry sub-humid areas, known as the drylands.
- The convention aims at achieving targets of sustainable development goals and poverty reduction by means of arresting and diverting Land degradation.
- The convention is particularly committed to a bottom-up approach, by engaging people at the local level in combating desertification and land degradation.
- India became a signatory to UNCCD on October 14, 1994, and rectified it on December 17, 1996.
- Global land outlook is a publication of UNCCD.

Forest Carbon Partnership Facility (FCPF)

- It is a global partnership of governments, businesses, civil society, and indigenous people's organizations.
- Its focus on reducing emissions from deforestation and forest degradation, forest carbon stock conservation, sustainable management of forests, and the enhancement of forest carbon stocks in developing countries, activities commonly referred to as REDD+
- FCPF supports REDD+ efforts through two separate but complementary funds, the FCPF Readiness Fund and the FCPF Carbon Fund.



Desertification and Drought day is observed by United Nations and celebrated each year on 17th June.

Desertification & Drought Day 17 June 2021

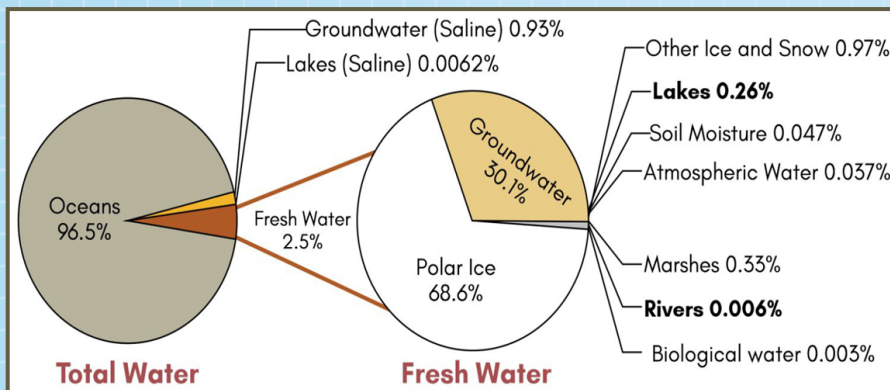


Restoration. Land Recovery.
We build back better with healthy land

The Green Revolution, based on the use of flood irrigation and chemical fertilizers, has resulted in land degradation and soil salinity. **M S Swaminathan the father of the Green Revolution in India calls for an "Evergreen Revolution"**, which involves the integration of ecological principles, and technological development and dissemination, which can result in improvement in productivity and at the same time can ensure ecological sustainability and social well-being.

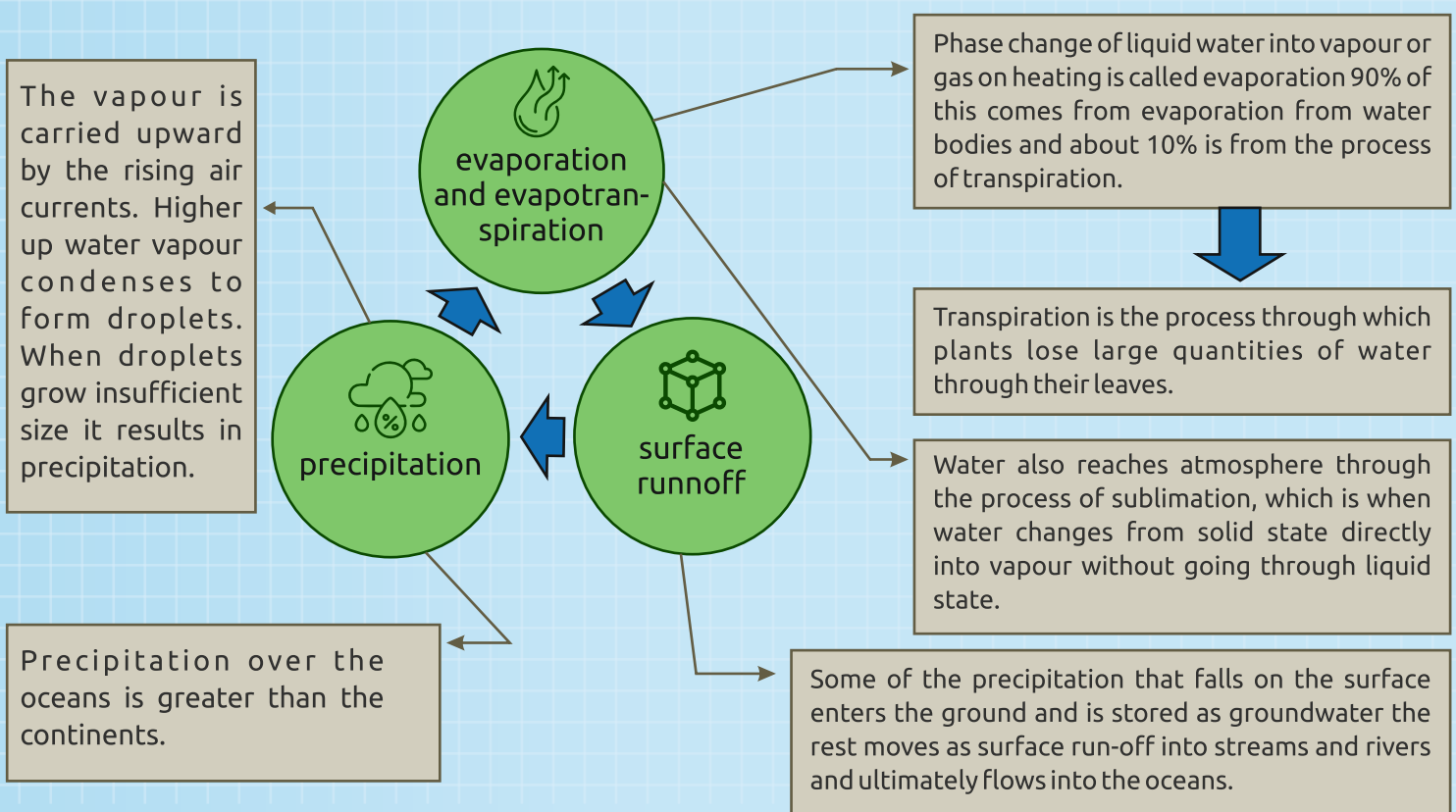
WATER DEGRADATION

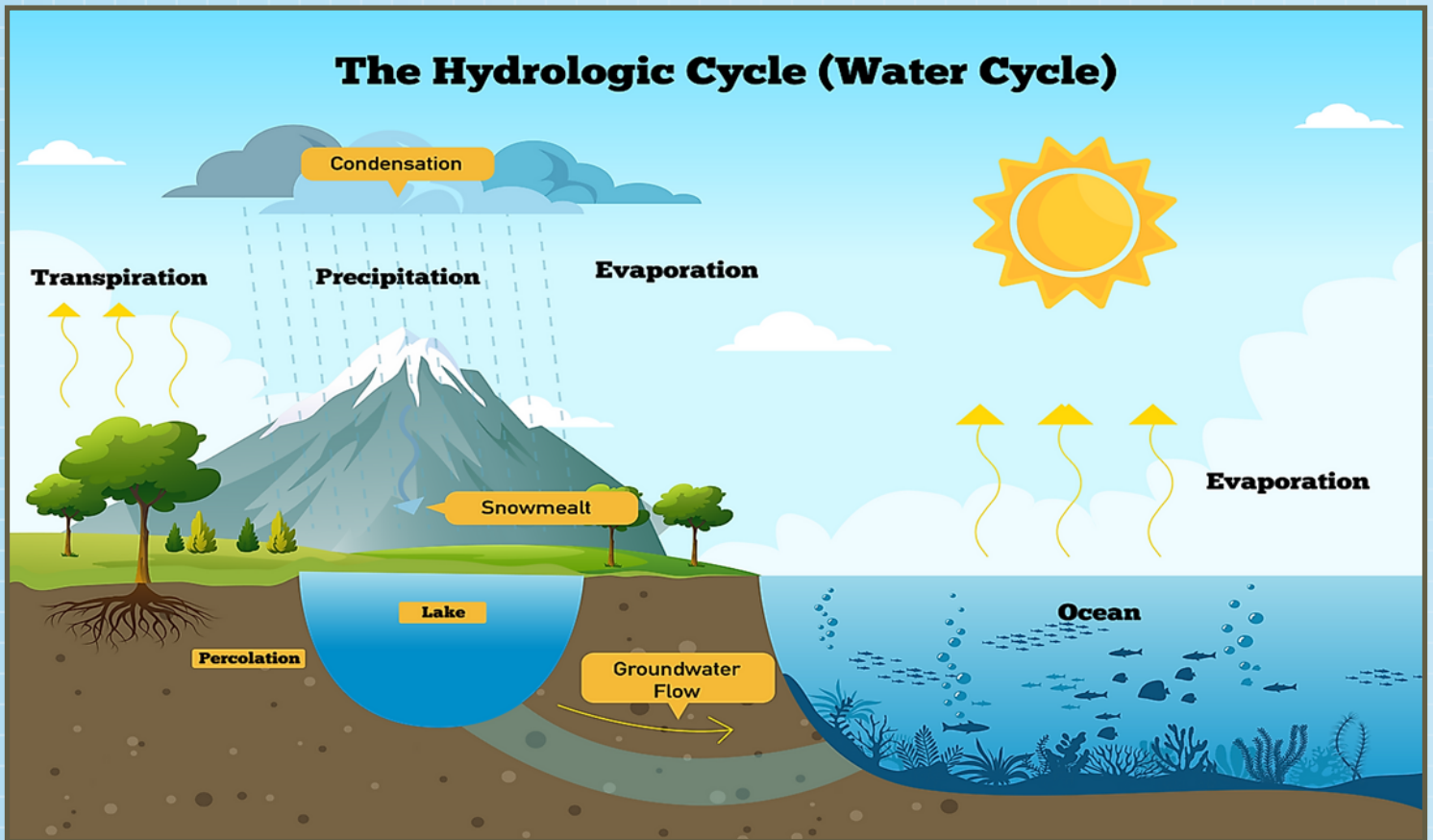
Distribution of water on the Earth's surface:



Water covers 71% of the Earth's surface. Out of this only 2.5% is freshwater. 68.6 % of the freshwater is locked up in ice and glaciers and 30.1% is in the ground. 1.3% of the freshwater is in lakes, rivers, streams, and clouds, etc.

Global circulation of water / Hydrological cycle:





**Effect of
water
degradation:**

Decreased
water
quantity
or flow



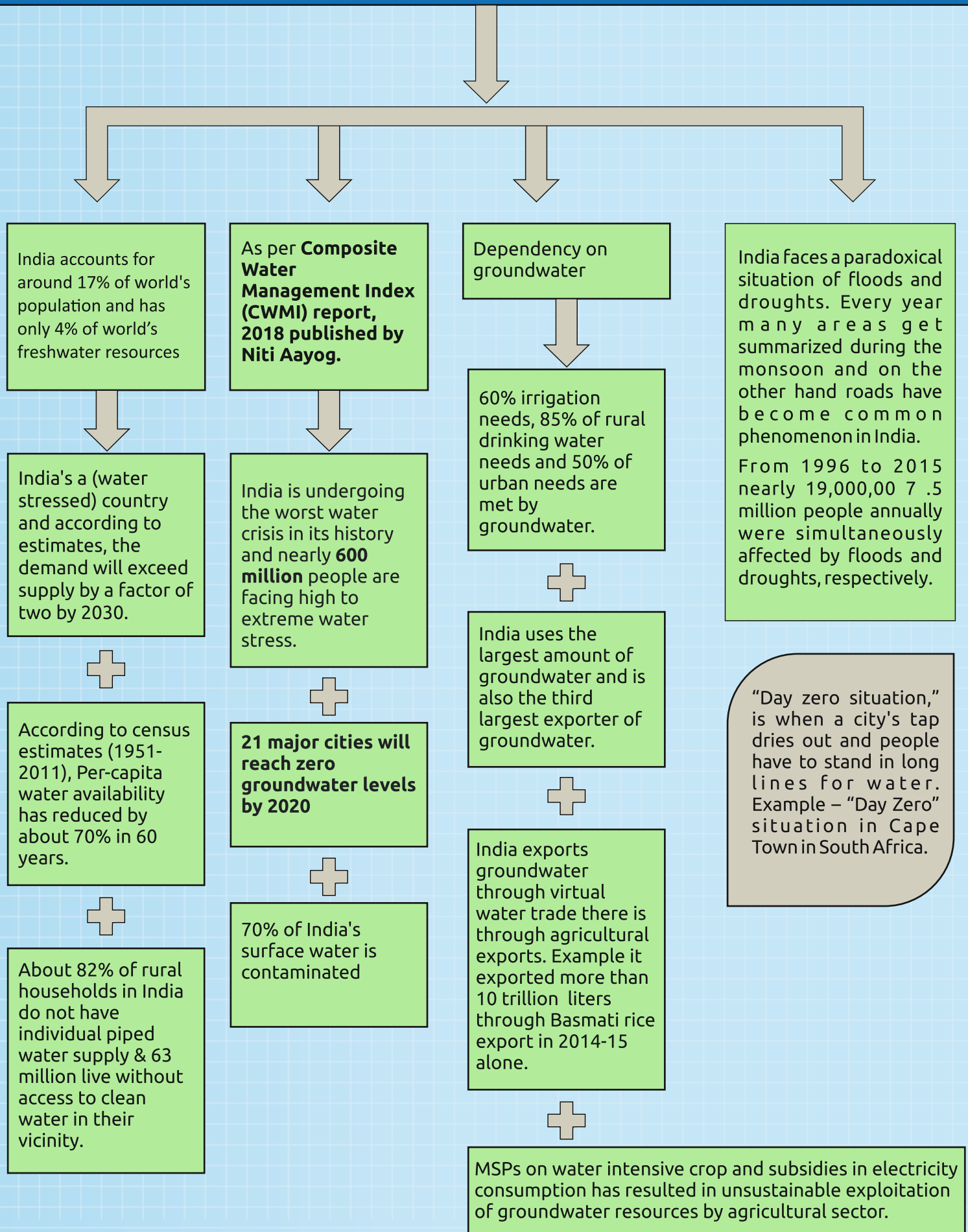
Decreased
water
quality

The water table is an underground boundary between the soil surface and the area where groundwater saturates spaces between sediments and cracks in rock. Water pressure and atmospheric pressure are equal at this boundary.



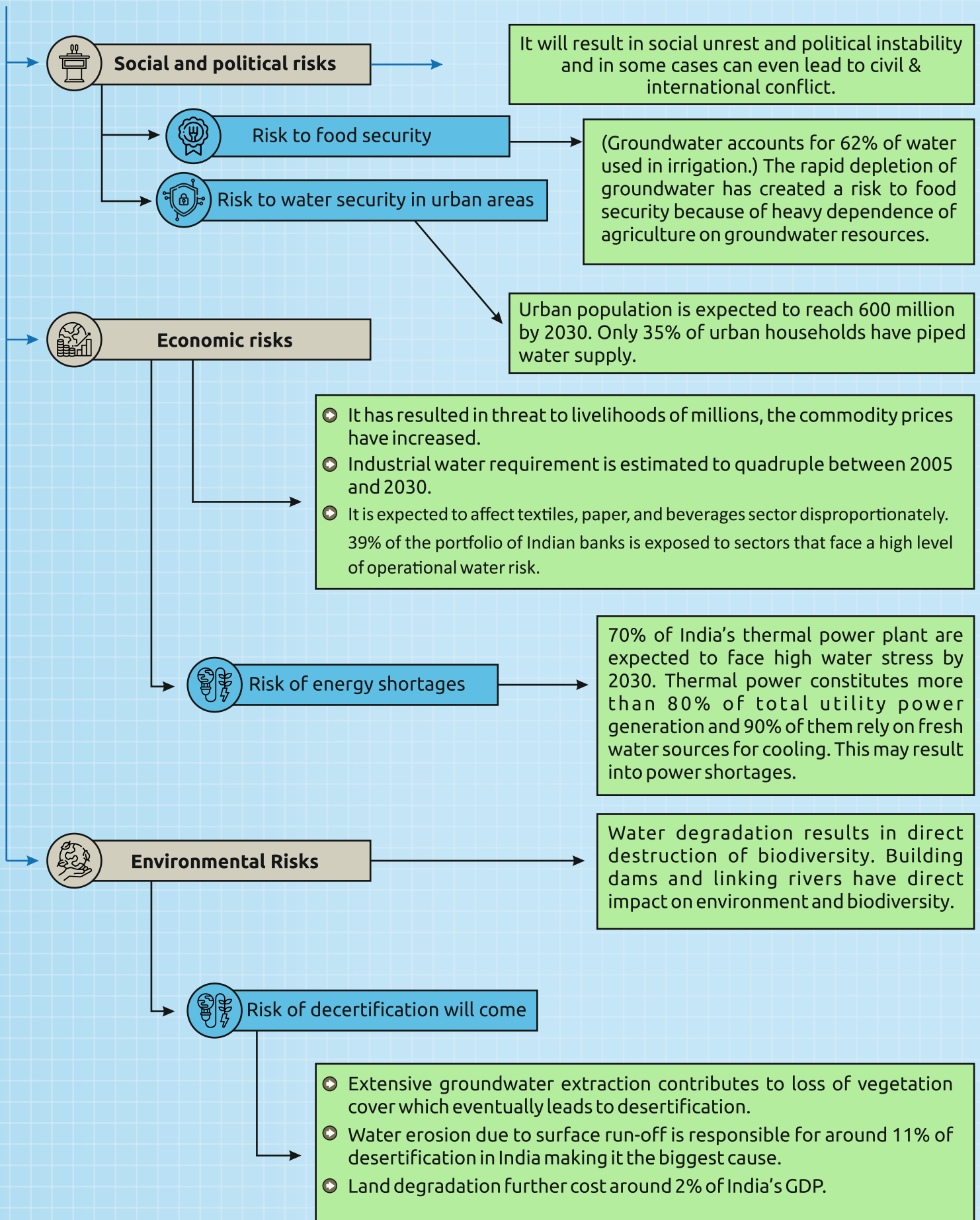


STATUS OF WATER IN INDIA:



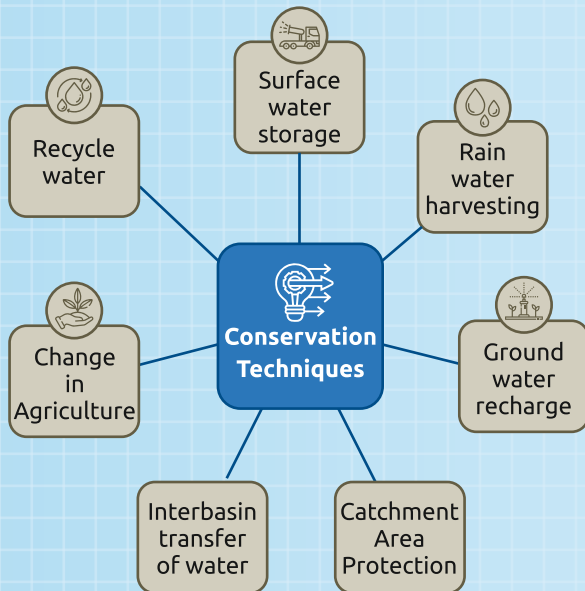


IMPLICATIONS OF WATER DEGRADATION: ●





Methods of water conservation:



Methods of rainwater harvesting

In urban areas

Roof top rainwater/run-off harvesting through

- Recharge pit
- Recharge trench
- Tube well
- Recharge well

In rural areas

Rainwater harvesting through

- Gully plug
- Contour bund
- Gabion structure
- Percolation tank
- Check Dam/Cement plug
- Recharge shaft
- Subsurface dyke

CATCHMENT AREA PROTECTION AND WATERSHED MANAGEMENT

Catchment Area Protection (CAP)

Catchment area protection includes actions, procedures or installations undertaken to prevent or reduce harm to environmental integrity of drainage areas used to catch water, such as reservoirs or basins.



PM Krishi Sinchai Yojana and World Bank assisted Neeranchal Watershed Program are designed for CAP

Watershed Management

Is a process of implementing land use practices and water management practices to protect and improve the quality of water and other natural resources within watershed.



It involves management of those land and water resources in a comprehensive manner

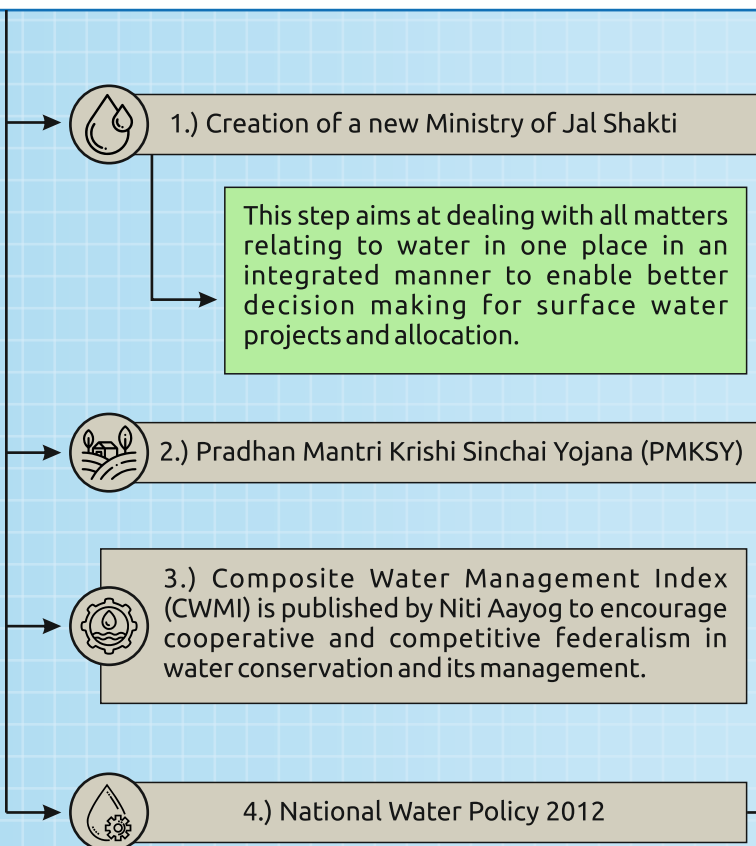
Traditional water conservation systems in various states

Water conservation system	State and region	Type
Jhalaras	Jodhpur (Rajasthan)	Stepwell
Talab Bandhi	Bundelkhand (UP), Udaipur (Rajasthan)	Lake
Bawaris	Rajasthan	Stepwell
Taanka	Thar desert region of Rajasthan	Cylindrical paved underground pit
Ahar Pynes	South Bihar	Ahars are reservoirs with embankments on three sides that are built at the end of diversion channels like pynes. Pynes are artificial rivulets.
Johad	Rajasthan, they are called Madaks in Karnataka and Pemghara in Odisha	Small earthen check dams



Panam Keni	Wayanad (Kerala)	Special type of well
Khadins	Jaisalmer (Rajasthan)	Embarkments
Kund	Western Rajasthan and Gujarat	Saucer-shaped catchment area
Baoli	Rajasthan, Delhi, Gujarat	Stepwell
Bhandara Phad	Maharashtra	Check dam
Buldhana Pattern	Buldhana district, Maharashtra	Storage type
Tamswada pattern	Nagpur and Wardha, Maharashtra	Storage type
Zings	Ladakh	Small tanks
Kuhls	Himachal Pradesh	Channels
Zabo	Nagaland	Channels
Jackwells	Shompen tribe of the Great Nicobar Islands	Wells
The Ramtek model	Maharashtra	Tanks
The Pat system	Jhabua district of Madhya Pradesh	Channels
The Eri system	Tamil Nadu	Tanks

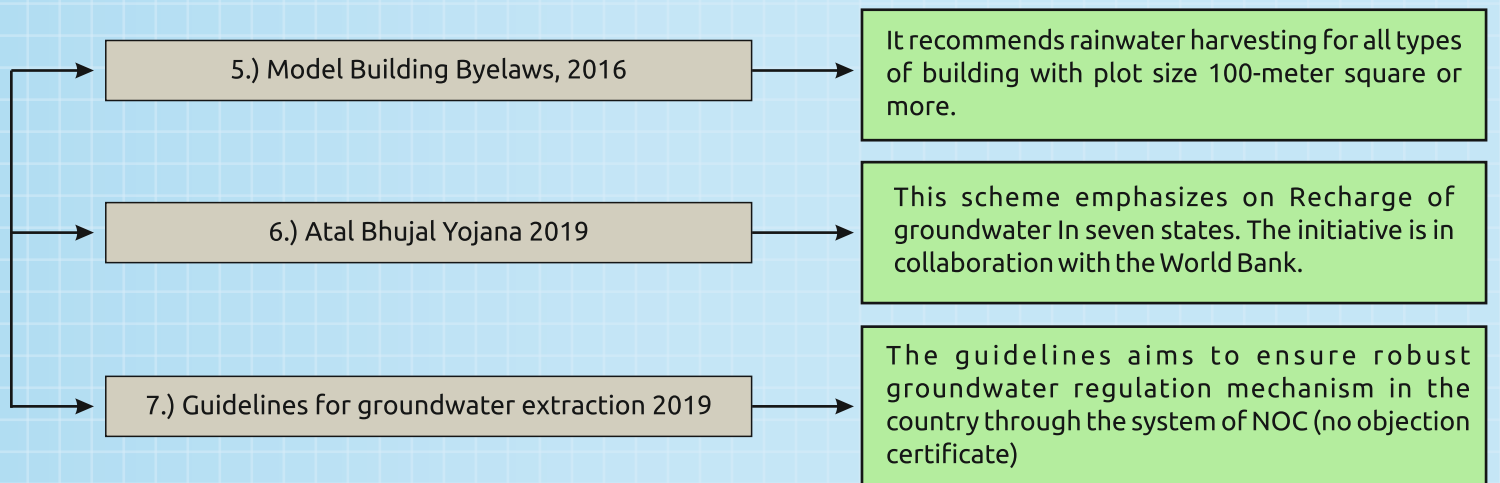
India's Policy Framework



In international policy frameworks such as Sustainable Development Goals (SDG), Paris Agreement & Sendai Framework have **convergence on water conservation** and its responsible use to ensure sustainable development, ensuring livelihood security for poor and the weak and reduced risks from disasters.

It aims at improving efficiency in agriculture using techniques such as micro-irrigation. It is a comprehensive scheme and deals with watershed development, afforestation, soil and moisture conservation, rainwater harvesting, horticulture, pasture development, etc.

The policy advocates rainwater harvesting and conservation of water. It also focuses on conservation of river & other water bodies and lays emphasis on scientific infrastructure development.



CENTRAL GROUND WATER AUTHORITY

Central Ground Water Authority has been constituted under Section 3 (3) of the Environment (Protection) Act, 1986 to regulate and control development and management of groundwater resources in the country.

Powers & Functions:

The Authority has been conferred with the following powers:

- (I) Exercise of powers under section 5 of the Environment (Protection) Act, 1986 for issuing directions and taking such measures in respect of all the matters referred to in sub-section (2) of section 3 of the said Act.
- (ii) To resort to penal provisions contained in sections 15 to 21 of the said Act.
- (ii) To regulate and control, management and development of ground water in the country and to issue necessary regulatory directions for the purpose.
- (iv) Exercise of powers under section 4 of the Environment (Protection) Act, 1986 for the appointment of officers.

For industry

introduced the concept of water conservation fees (WCF), recycling and treating polluted water and provides for installing digital flow meters. It makes rain top roof top rainwater harvesting mandatory.

For drinking and domestic use

request for NOC shall be considered only when water supply department or agency is unable to supply adequate amount of water in the area.

Flexibility to states

states may suggest additional conditions.

Monitoring

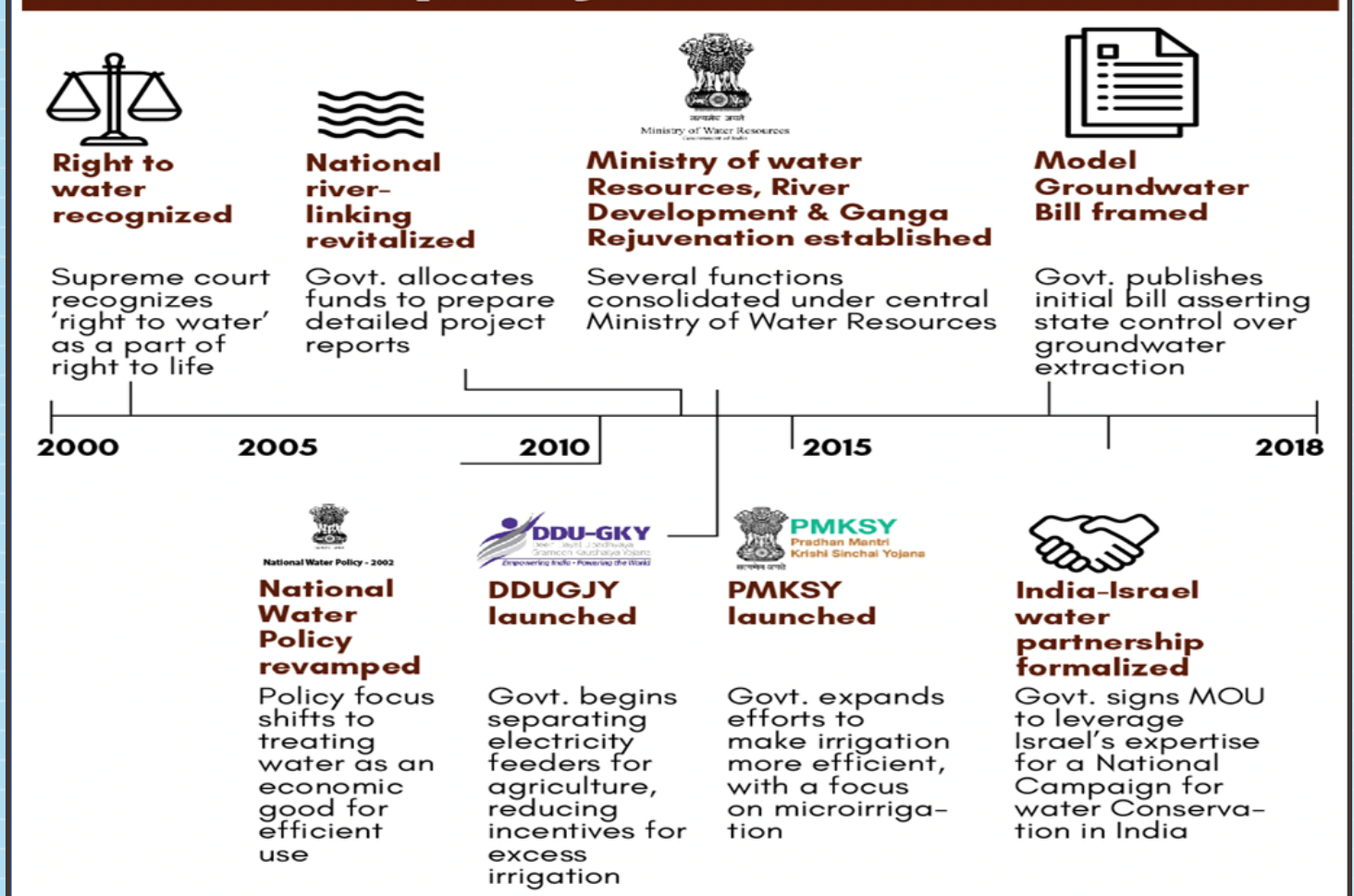
Monthly water level data should be submitted to Central ground water authority through web portal.

Exempted from requirement of NOC

agricultural users, users **employing non—energized means to extract water**, individual households, and arm forces establishment during operational deployment or during mobilization in forward locations.



Water policy timeline in india



SUCCESSFUL MODELS OF DECENTRALIZED WATER MANAGEMENT

MUKHYA MANTRI JAL SWAYAMBHAN ABHIYAN (MJSA)	Of Rajasthan	+ a multistakeholder programme which aims to make villages self sufficient in water	+ adopts a participatory water management approach	+ Use technology and focus on creation of water conservation structure
NEERU-CHETTU PROGRAMME	ANDHRA PRADESH	+ Aims at drought-proofing the state and reduce economic inequalities	+ Focus on improving irrigation and providing water in drought prone areas	+ The programme focus on use of scientific technology and repair and renovation.
JALYUKT SHIVAR ABHIYAN	Maharashtra	+ Aims to make Maharashtra drought-free with focus on 5000 water scarce villages	+ The approach of this programme focuses on deepening and Widening of streams and construction of check dams.	+ The program also harnesses technologies such as geo-tagging of water resources.
Mission Kakatiya	Telangana	+ aims to restore over 46,000 tanks across the state and bring over 20 lakh acres land under cultivation	+ The programme focus on Development of minor irrigation structures, promoting community based irrigation management, and restoration of tanks	